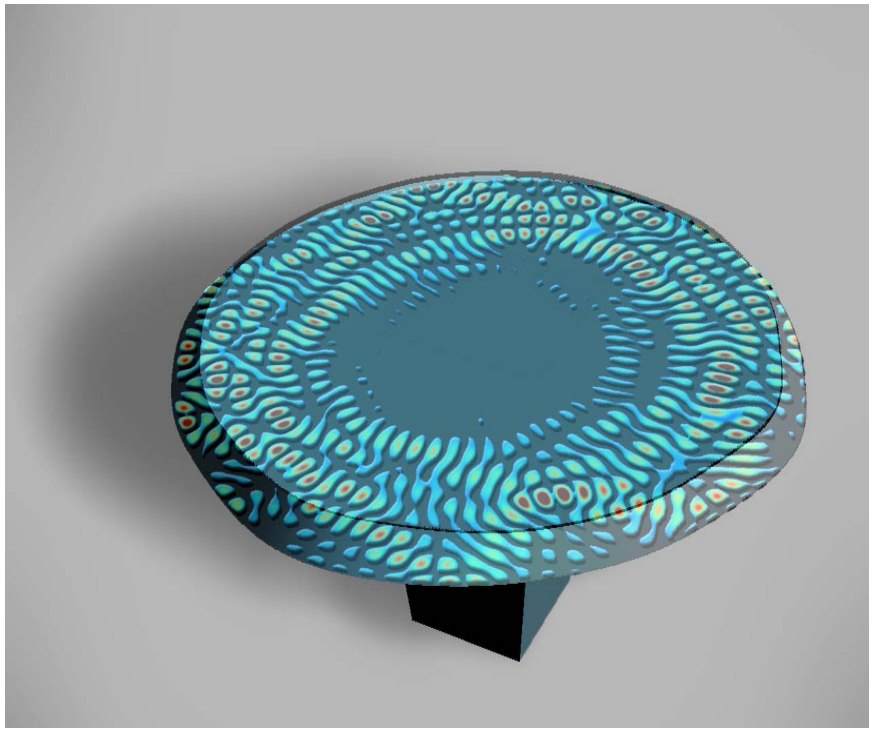
Microlasing by Dynamical Anderson Localization of Light

PI: Evgenii Narimanov (Princeton U.), DMR-0134736

[Collaboration with Hui Cao (Northwestern U.), DMR-0070697]

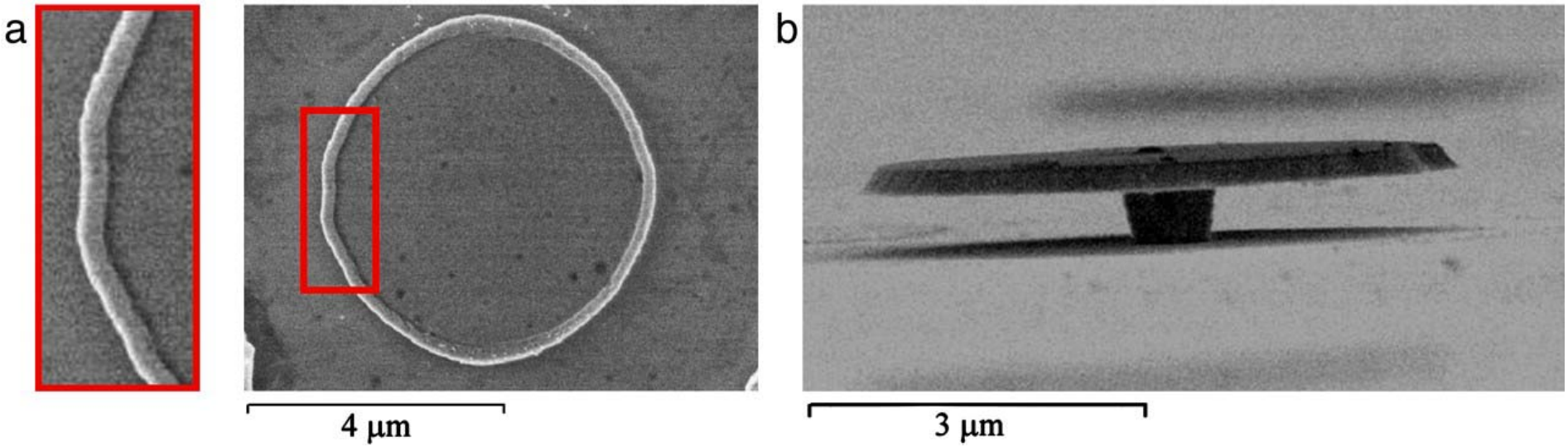
We demonstrate lasing action from dynamically localized mode in a microdisk resonator with rough boundary.

In contrast to microlasers based on stable ray trajectories, the performance of our device takes advantage of Anderson localization in angular momentum, and is robust with respect to the boundary roughness and other imperfection.



[V.Podolskiy, E.Narimanov. W.Fang, H.Cao, PNAS 101, 10498 (2004)]

Actual fabricated devices show many boundary imperfections:



Nevertheless the lasing modes are not "random", but are exponentially localized in angular momentum (left) and form high-quality quasi-whispering-gallery modes, confirmed by direct experimetnal imaging (middle) and comparison of the mode intensity with theory (right):